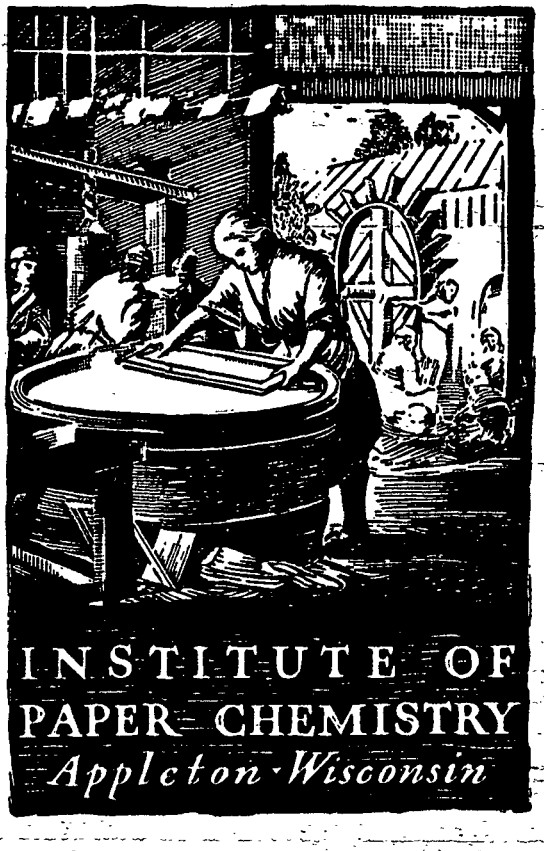

CONTINUOUS BASELINE STUDY

Project 1108-B

Summary Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

October 1, 1953

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS BASELINE STUDY

Project 1108-B

Summary Report

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Appleton, Wisconsin

This report presents a summary of the results obtained in conjunction with the Continuous Baseline Study from October 1, 1952, to September 30, 1953--a period of twelve months--and is supplementary to a similar report dated November 1, 1952. The duration of each reported period as well as the number of samples submitted is given in Table I, and the number of samples submitted by each mill for each of the reported periods is shown in Table II. Also shown in Table II is the total number of samples submitted by each mill for the twelve periods.

As mentioned above, previous summary reports have presented data for the first 63 periods of the Continuous Baseline Study. It may be recalled that during the first 63 periods, the current F.K.I. averages for basis weight oscillated about the 43-lb. level. It may be seen in Table III and Figure 1 that during the interim from periods 64 to 75, basis weight values have shown the same tendency.

The current F.K.I. caliper averages exhibited a definite trend downward during the first 63 periods. From period 64 to 75, caliper values have continued to maintain a very low level in the vicinity of 13 points.

The first 36 periods of the Continuous Baseline Study witnessed a substantial rise in bursting strength results. A decline was noted during periods 37 to 49. It may be seen in Table II and Figure 1 that bursting strength values maintained a higher level during periods 50 to 63. Since then, this higher level has been maintained.

TABLE I

DURATION OF REPORTED PERIODS--NUMBER OF 42-LB.
KRAFT LINERBOARD SAMPLES PER PERIOD

Reported Period	Duration	Number of Samples
64	October 1 through October 31, 1952	89
65	November 1 through November 30, 1952	95
66	December 1 through December 31, 1952	96
67	January 1 through January 31, 1953	90
68	February 1 through February 28, 1953	79
69	March 1 through March 31, 1953	105
70	April 1 through April 30, 1953	85
71	May 1 through May 31, 1953	104
72	June 1 through June 30, 1953	80
73	July 1 through July 31, 1953	102
74	August 1 through August 31, 1953	116
75	September 1 through September 30, 1953	99
	Total	1140

TABLE II

TABULATION BY PERIODS OF THE NUMBER OF SAMPLES OF 42-LB. KRAFT LINERBOARD SUBMITTED BY EACH MILL

	Mills														
Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
64	10	12	8	12	4	7	2	8	6	8	0	5	7		
65	8	16	8	8	5	11	10	7	3	6	0	4	9		
66	8	20	8	12	1	13	4	6	5	6	0	8	5		
67	8	16	8	10	3	10	10	8	5	4	0	4	4		
68	6	16	8	7	3	3	4	8	5	6	0	6	7		
69	12	16	8	11	3	13	10	8	8	8	0	4	4		
70	6	16	8	8	2	5	8	2	19	4	0	0	7		
71	12	20	8	12	2	6	6	6	8	4	0	12	8		
72	6	12	8	7	2	6	4	6	3	8	0	6	10		2
73	8	24	8	7	4	5	10	2	6	6	0	6	6	9	1
74	10	16	8	14	4	6	10	6	7	6	0	10	8	8	3
75	8	20	8	11	3	9	8	6	2	4	0	8	3	8	1
Totals	102	204	96	119	36	94	86	79	82	70	0	73	78	25	7

TABLE III

TABULATION OF CURRENT F.K.I. AVERAGES BY PERIODS

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i. g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
64	42.9	13.5	107	34	353	391
65	42.9	13.4	108	35	364	400
66	43.0	13.2	108	34	360	394
67	43.0	13.1	108	34	353	390
68	42.9	13.3	109	34	350	388
69	43.0	13.2	110	35	363	397
70	43.0	13.4	108	34	358	390
71	43.2	13.4	110	35	364	399
72	43.0	13.1	108	33	351	387
73	42.9	12.9	111	33	349	385
74	43.1	13.0	110	33	347	382
75	42.7	12.8	112	33	341	374

COMPARISON OF CURRENT F.K.I. AVERAGES BY PERIODS

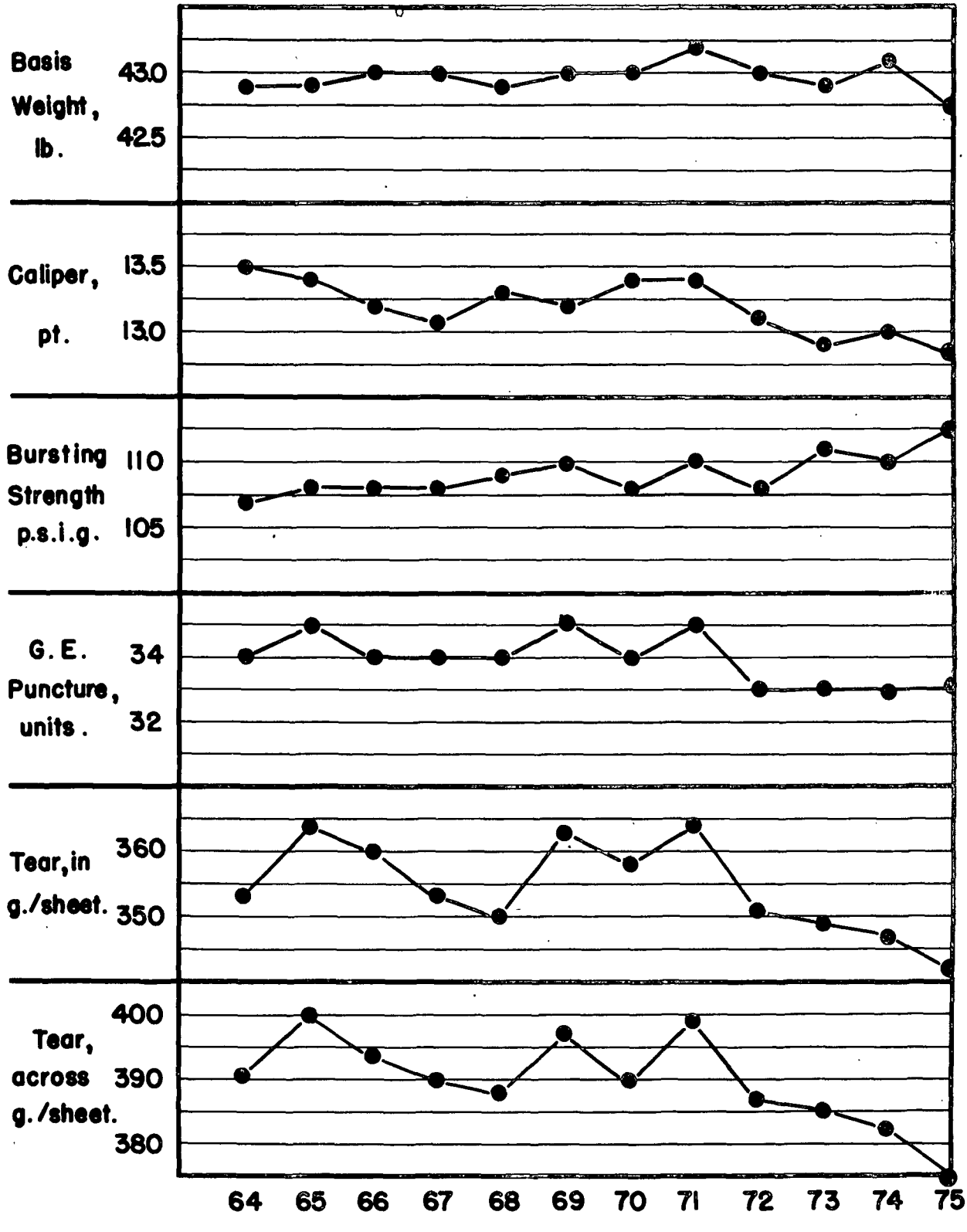


FIGURE 1

G. E. puncture values have exhibited a gradual decline from the inception of the Continuous Baseline Study to the present time. It may be noted in Figure 1 that the current G. E. puncture average is 33 units as compared with the average at the beginning of the study of 40 units.

Tearing strength during the first thirty periods was at a high level. However, since that time, there has been a decline. It may be seen in Figure 1 that both machine and cross-machine direction tearing strength are currently at a low level.

Thus, the trends for the interim covered by period 64 to 75 are the following:

1. Basis weight has remained relatively constant near the 43-lb. level.
2. Caliper has maintained a low level slightly above 13 points.
3. Bursting strength has held a strong level.
4. G. E. puncture has declined to a low level.
5. Elmendorf tear has remained at a low level.

Table IV presents the current mill averages for Mill A for periods 64 to 75. The averages are shown graphically in Figure 2. In general, the trends outlined above for the current monthly F.K.I. averages apply also to the results for Mill A. The caliper results have been especially low, being very often below 13 points.

The current mill averages for Mill B, shown in Table V and graphically illustrated in Figure 3, indicate that the basis weight

TABLE IV

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL A

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
64	42.8	12.9	112	33	335	385
65	42.9	13.0	110	35	344	396
66	43.4	13.0	111	34	344	399
67	43.6	12.7	112	35	348	396
68	43.3	12.5	109	33	336	386
69	43.3	12.6	111	34	343	391
70	42.9	12.6	109	33	332	374
71	43.1	12.9	109	34	340	395
72	42.9	12.7	111	33	338	386
73	43.2	12.7	110	33	328	376
74	42.8	12.4	113	33	323	377
75	43.0	12.6	113	33	322	372

TABLE V

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL B

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i. g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
64	43.7	13.1	110	31	324	377
65	43.5	12.9	107	32	364	390
66	43.4	12.8	110	29	311	365
67	42.8	12.2	110	29	297	360
68	43.3	12.8	111	29	301	354
69	43.6	12.9	115	31	323	371
70	43.3	13.0	105	28	288	326
71	42.7	13.0	108	29	304	349
72	42.8	12.9	106	28	291	341
73	42.6	12.7	107	28	290	333
74	42.8	12.4	108	29	292	335
75	42.8	12.7	119	29	300	353

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL A

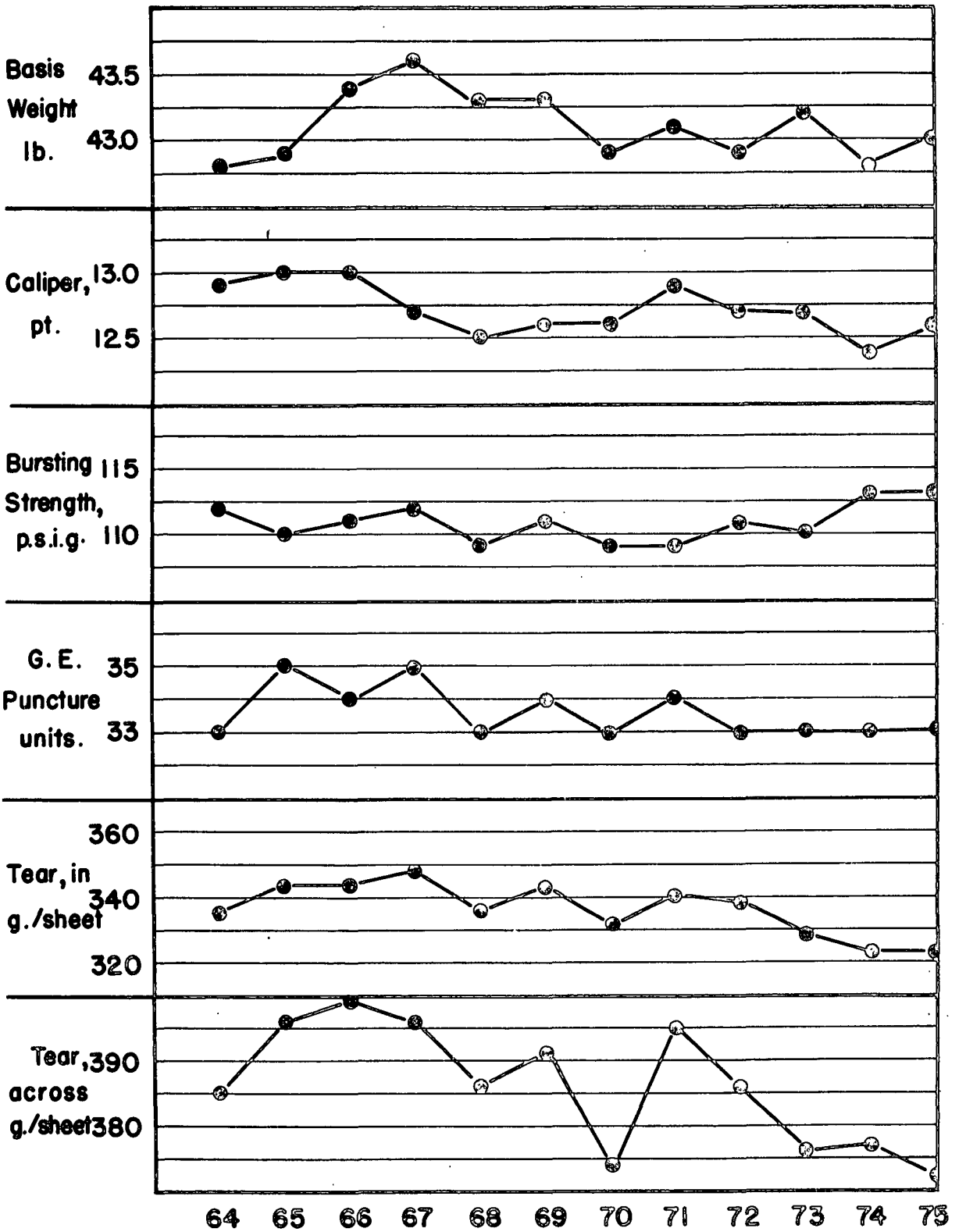


FIGURE 2

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL B

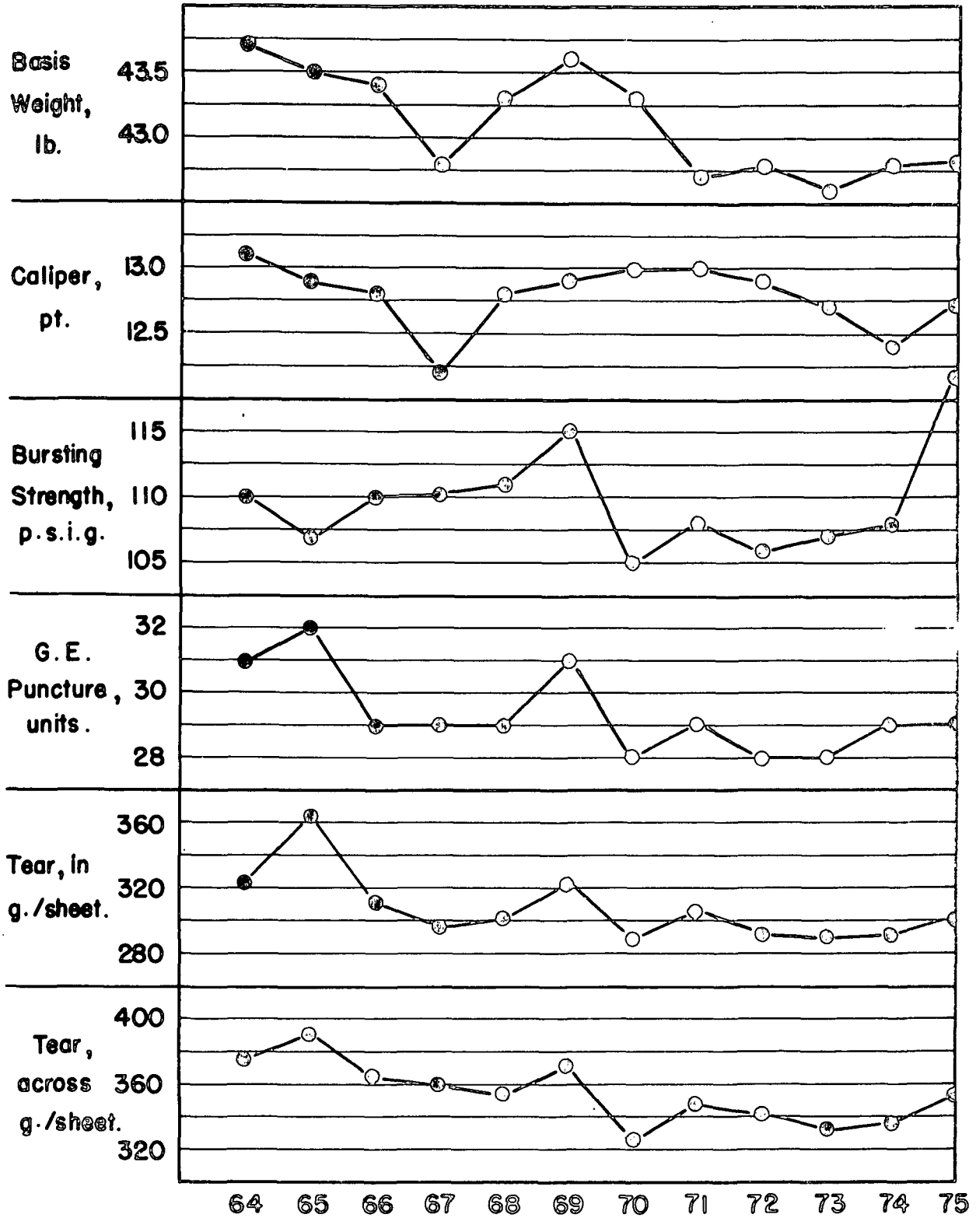


FIGURE 3

results have varied greatly. Caliper has been generally under 13 points whereas the other tests have exhibited trends similar to those for the current F.K.I. averages.

The current mill averages for the 64th to 75th periods are presented in Table VI for Mill C. A graphic presentation is given in Figure 4. It may be noted that basis weight has fluctuated between 42 and 44 lb. The other tests have also shown rather wide variations during the past year.

Presented graphically in Figure 5 are the current mill averages shown in Table VII for Mill D. The following trends are evident from the data shown in Figure 5: (1) Basis weight has maintained a high level between 43 and 44-lb.; (2) caliper has been generally slightly above the 13-point level but now is slightly below; (3) bursting strength has maintained a high level; (4) G. E. puncture averages have exhibited a decline for the last several periods although the values have generally been above the current F.K.I. level; and (5) tear values have shown slight downward trends recently.

The current mill averages for Mill E are shown in Table VIII, and a graphic presentation is given in Figure 6. It may be noted that the basis weight results have been near the 42-lb. level most of the time except for recent months when the test results showed an increase to the 43-lb. level and above. Caliper results have generally averaged about 14 points. Bursting strength has maintained a strong level generally above 110 points. G. E. puncture results have varied between 30 and 34 units. Tearing strength results have varied over a considerable range.

TABLE VI

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL C

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
64	43.3	14.9	106	37	372	413
65	43.2	14.8	107	36	373	414
66	42.1	13.9	106	35	346	390
67	42.7	14.4	106	33	329	373
68	42.7	14.3	105	34	332	383
69	43.1	14.1	112	36	367	410
70	42.9	14.3	107	34	352	395
71	43.9	14.1	108	37	350	399
72	43.8	14.6	108	37	383	413
73	42.1	13.5	111	32	320	371
74	43.7	14.5	107	35	340	378
75	42.5	13.3	113	34	344	382

TABLE VII

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL D

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i. g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
64	42.7	13.0	102	38	371	407
65	43.0	13.3	112	38	386	432
66	43.4	13.1	105	31	389	419
67	43.6	13.3	111	37	384	421
68	44.0	13.3	110	38	380	429
69	43.8	13.1	109	39	386	431
70	44.2	13.4	111	38	388	430
71	43.4	13.1	110	37	376	416
72	43.3	12.8	108	37	373	405
73	43.7	12.8	111	36	386	404
74	43.4	12.8	107	35	369	385
75	43.1	12.3	110	34	357	372

TABLE VIII

TABULATION OF CURRENT AVERAGES FOR MILL E BY PERIODS

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Elmendorf Tear, g./sheet Across
64	42.2	14.3	106	32	366	355
65	42.4	14.3	110	32	363	361
66	42.1	14.0	118	31	383	374
67	42.1	14.0	105	33	394	374
68	41.7	13.7	114	32	387	369
69	41.9	13.9	110	34	402	365
70	42.6	14.6	109	34	419	386
71	43.5	14.0	118	34	404	388
72	43.6	13.6	107	34	356	384
73	43.2	14.0	116	32	356	393
74	41.9	12.9	106	30	336	356
75	42.2	13.3	106	30	344	342

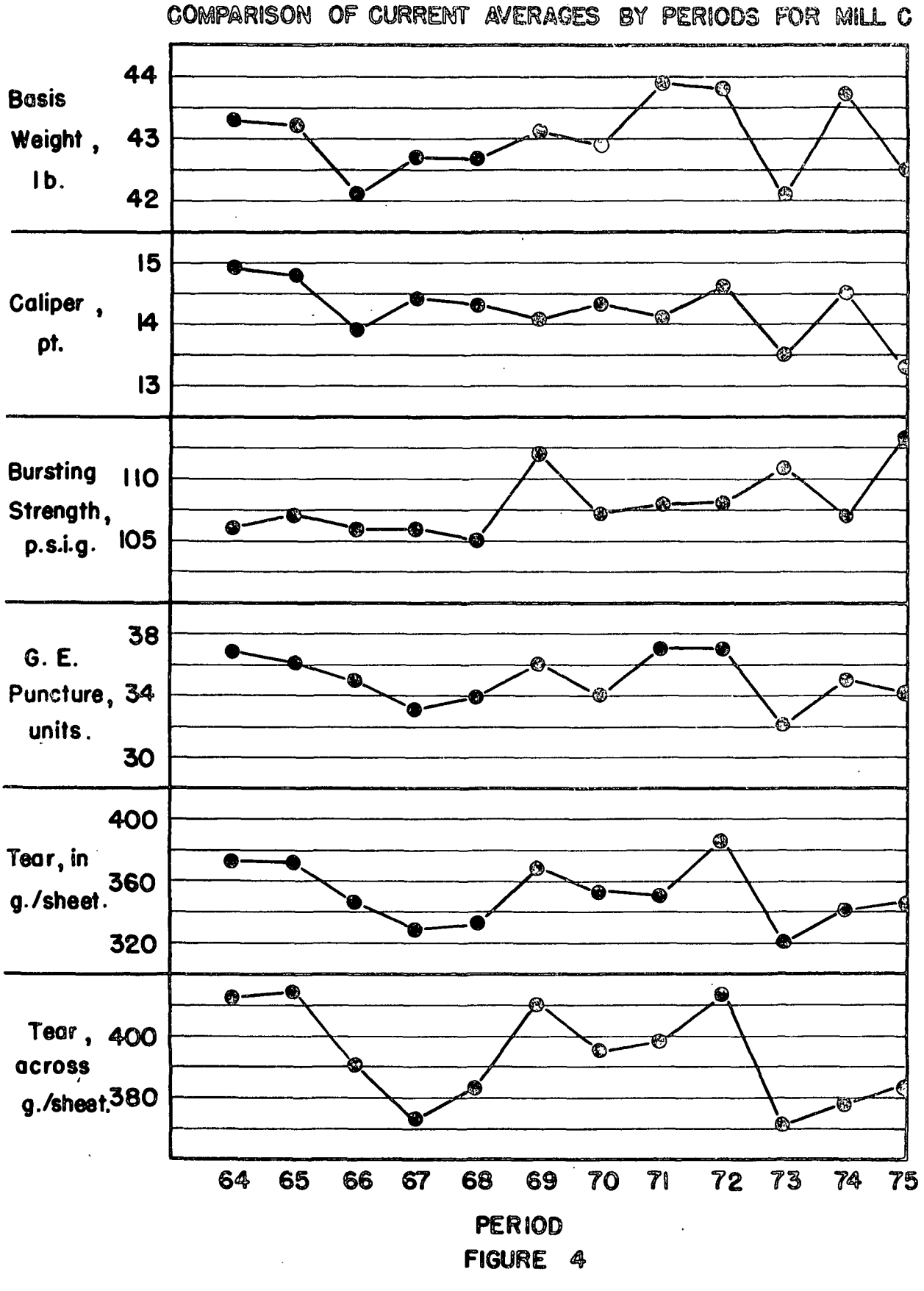

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL C
Basis Weight, lb.
44
43
42
Caliper, pt.
15
14
13
Bursting Strength, p.s.i.g.
110
105
G. E. Puncture, units.
38
34
30
Tear, in g./sheet.
400
360
320
Tear, across g./sheet.
400
380
64 65 66 67 68 69 70 71 72 73 74 75
PERIOD

FIGURE 4

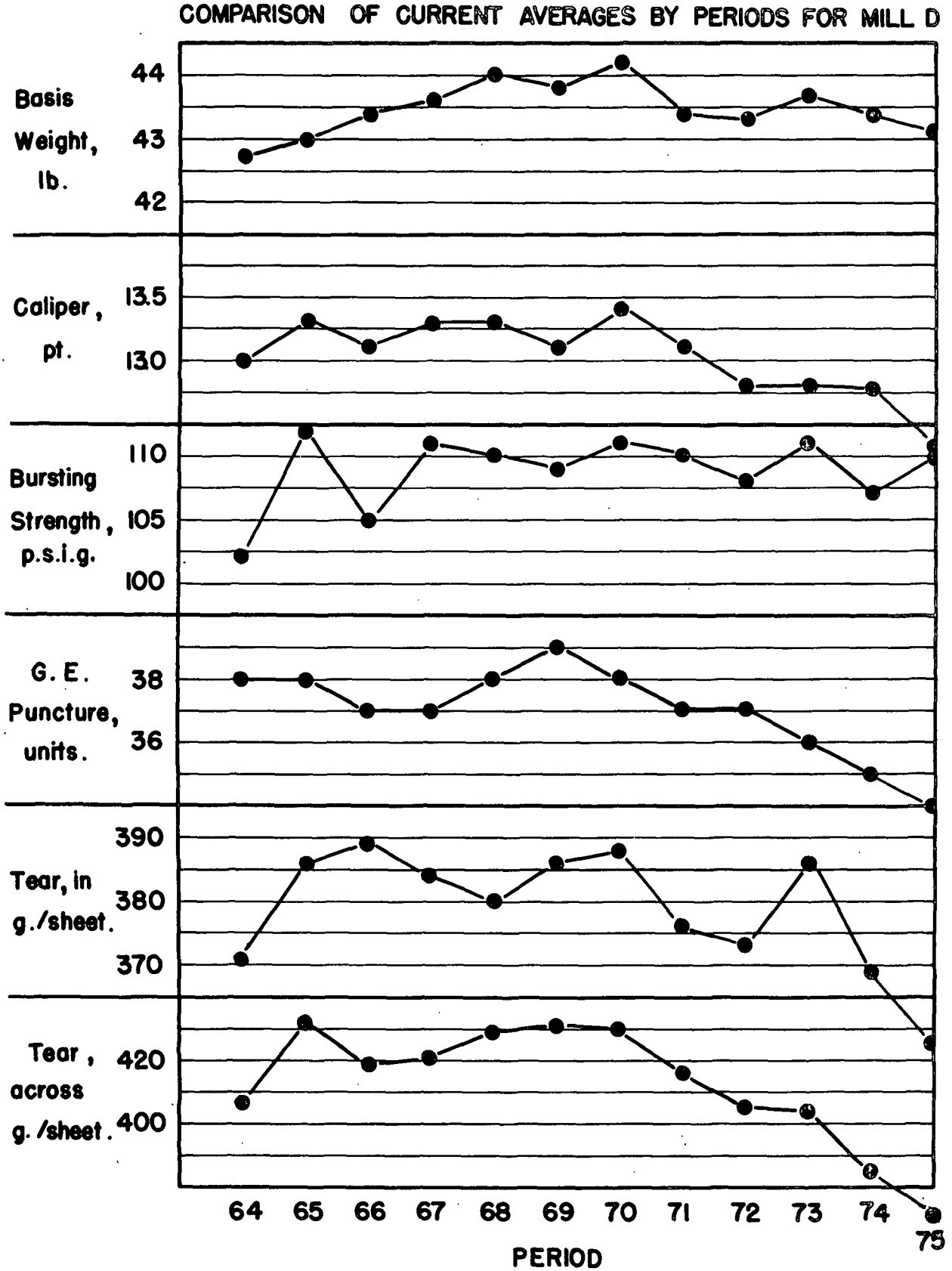

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL D
Basis Weight, lb.
44
43
42
Caliper, pt.
13.5
13.0
Bursting Strength, p.s.i.g.
110
105
100
G. E. Puncture, units.
38
36
Tear, in g./sheet.
390
380
370
Tear, across g./sheet.
420
400
64
65
66
67
68
69
70
71
72
73
74
75
PERIOD

FIGURE. 5

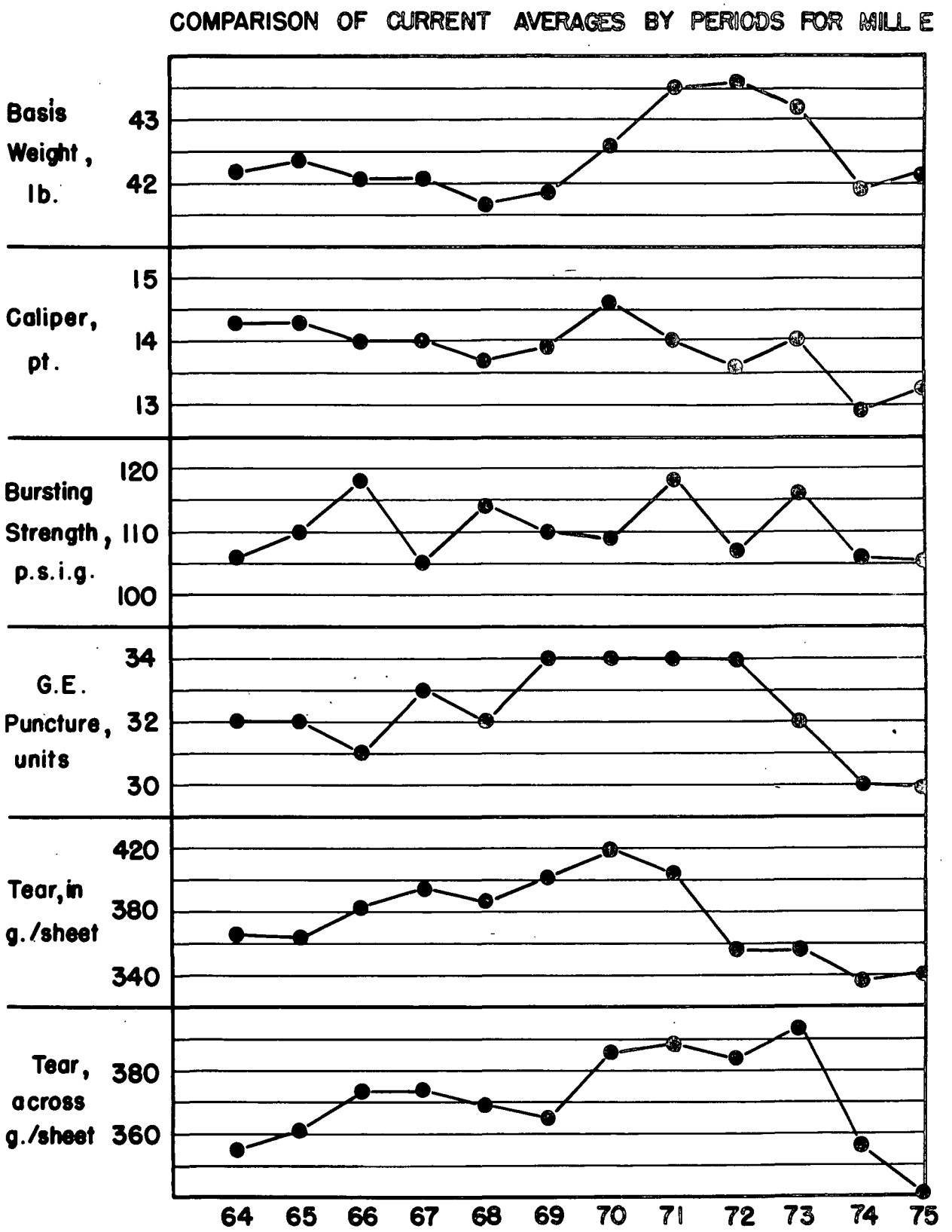

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL E
Basis Weight, lb.
43
42
Caliper, pt.
15
14
13
Bursting Strength, p.s.i.g.
120
110
100
G.E. Puncture, units
34
32
30
Tear, in g./sheet
420
380
340
Tear, across g./sheet
380
360
64
65
66
67
68
69
70
71
72
73
74
75
PERIOD

FIGURE 6

Illustrated graphically in Figure 7 are the current mill averages shown in Table IX for Mill F. It is evident from the results shown in Table IX and Figure 7 that basis weight has decreased as has caliper; bursting strength has varied considerably; G. E. puncture and Elmendorf tear have maintained levels considerably above the F.K.I. averages.

The current mill averages for Mill G are shown in Table X and presented in graphic form in Figure 8. It may be seen in Figure 8 that a trend to higher basis weight and bursting strength values is evident at the present time. Caliper has maintained a fluctuating level near 13 points. G. E. puncture results have shown a downward trend whereas Elmendorf tear results have shown an upward trend for the machine direction and have maintained a relatively constant level for the cross-machine direction.

The current mill averages for Mill H, which are shown in Table XI and presented graphically in Figure 9, exhibit the following trends: relatively constant basis weight, a very low caliper level, fluctuating bursting strength which appears to be gaining strength at the present time, declining G. E. puncture, and a highly variable tearing strength level.

The current mill averages for Mill I presented in Table XII and illustrated graphically in Figure 10 show trends to higher weight, variable caliper, variable bursting strength, constant G. E. puncture and fluctuating tearing strength.

TABLE IX

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL F

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Elmendorf Tear, g./sheet Across
64	44.7	14.7	106	40	401	448
65	43.5	14.5	102	41	403	439
66	43.6	13.4	102	39	389	423
67	43.3	13.5	99	37	386	411
68	43.6	13.3	102	41	379	419
69	43.0	13.0	105	38	398	430
70	42.7	13.1	99	39	406	416
71	42.7	13.2	106	38	411	434
72	41.8	12.7	105	35	374	405
73	42.3	12.7	108	36	403	417
74	42.6	13.0	113	36	365	410
75	42.2	13.1	113	36	377	419

TABLE X

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL G

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i. g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Elmendorf Tear, g./sheet Across
64	42.2	12.4	103	34	317	358
65	42.8	12.4	107	35	340	390
66	43.5	12.0	104	34	341	373
67	43.1	12.7	104	33	328	370
68	43.2	12.4	109	34	337	376
69	43.4	12.6	109	35	348	387
70	43.6	13.0	113	34	338	384
71	44.7	13.6	114	36	361	396
72	43.7	12.8	112	32	333	382
73	44.5	12.4	121	35	357	382
74	45.1	12.7	125	34	352	374
75	44.8	12.6	127	34	342	378

TABLE XI

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL H

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Elmendorf Tear, g./sheet Across
64	42.6	12.4	108	35	344	394
65	42.8	12.3	113	36	357	410
66	43.2	12.6	107	35	358	401
67	43.2	12.6	108	34	356	403
68	42.9	12.3	107	34	347	393
69	42.8	12.3	107	34	346	400
70	43.0	12.9	105	34	358	395
71	42.9	12.2	112	35	362	409
72	43.1	12.1	108	33	358	400
73	42.4	11.8	111	32	349	383
74	43.3	12.2	109	32	349	392
75	42.6	12.2	110	32	332	372

TABLE XII

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL I

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Elmendorf Tear, g./sheet Across
64	42.3	13.3	107	32	333	387
65	42.3	13.3	105	31	337	398
66	42.3	13.3	105	32	347	399
67	43.0	13.1	110	32	343	390
68	42.9	13.6	108	32	331	380
69	42.7	13.2	110	32	339	390
70	42.7	13.4	105	32	334	394
71	42.6	13.4	106	32	335	391
72	43.0	13.8	105	32	340	390
73	43.1	13.8	109	32	346	401
74	43.2	13.2	112	32	342	403
75	42.5	13.0	105	32	316	376

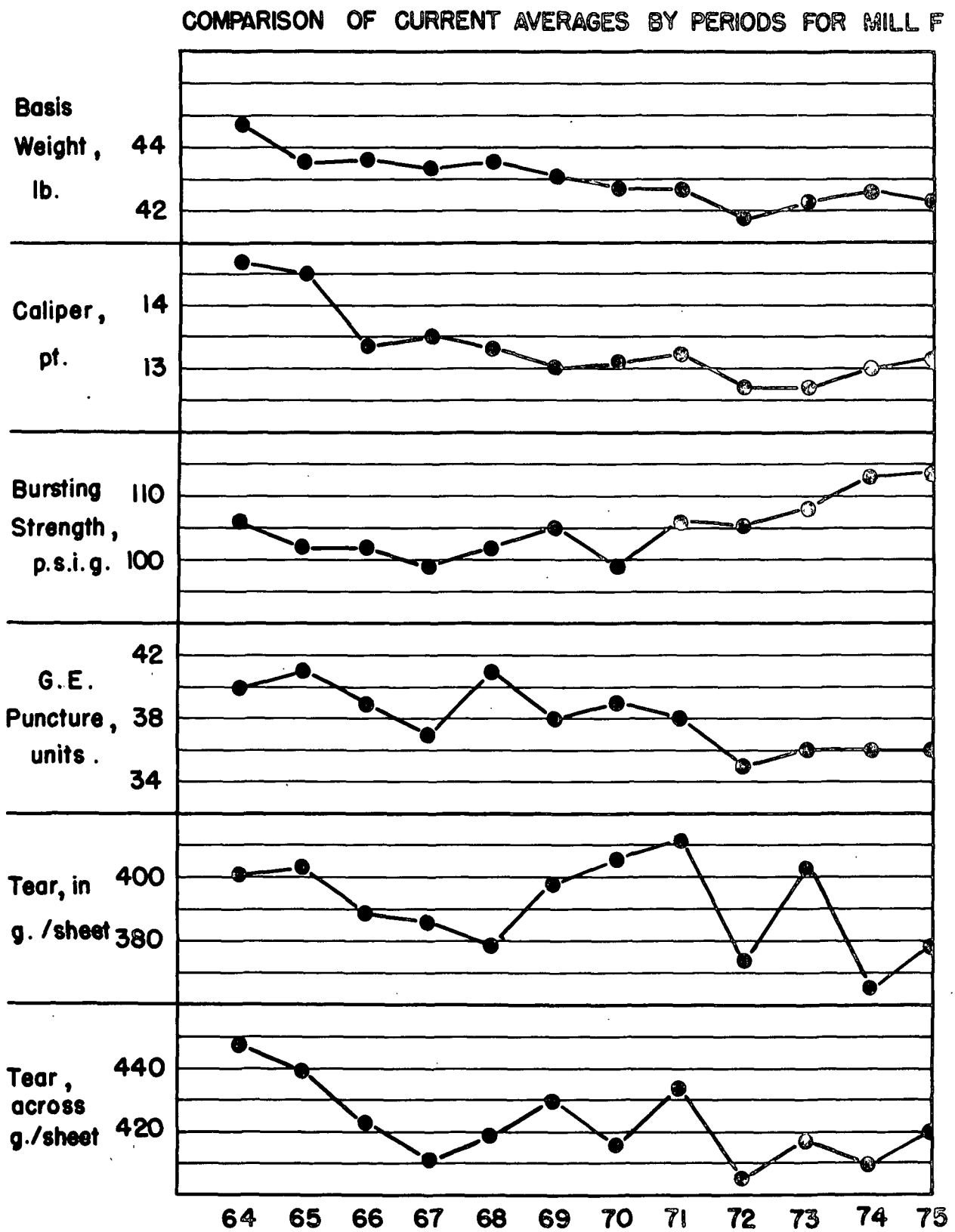

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL F
Basis Weight, lb.
44
42
Caliper, pt.
14
13
Bursting Strength, p.s.i.g.
110
100
G.E. Puncture, units.
42
38
34
Tear, in g./sheet
400
380
Tear, across g./sheet
440
420
64 65 66 67 68 69 70 71 72 73 74 75
PERIOD

FIGURE 7

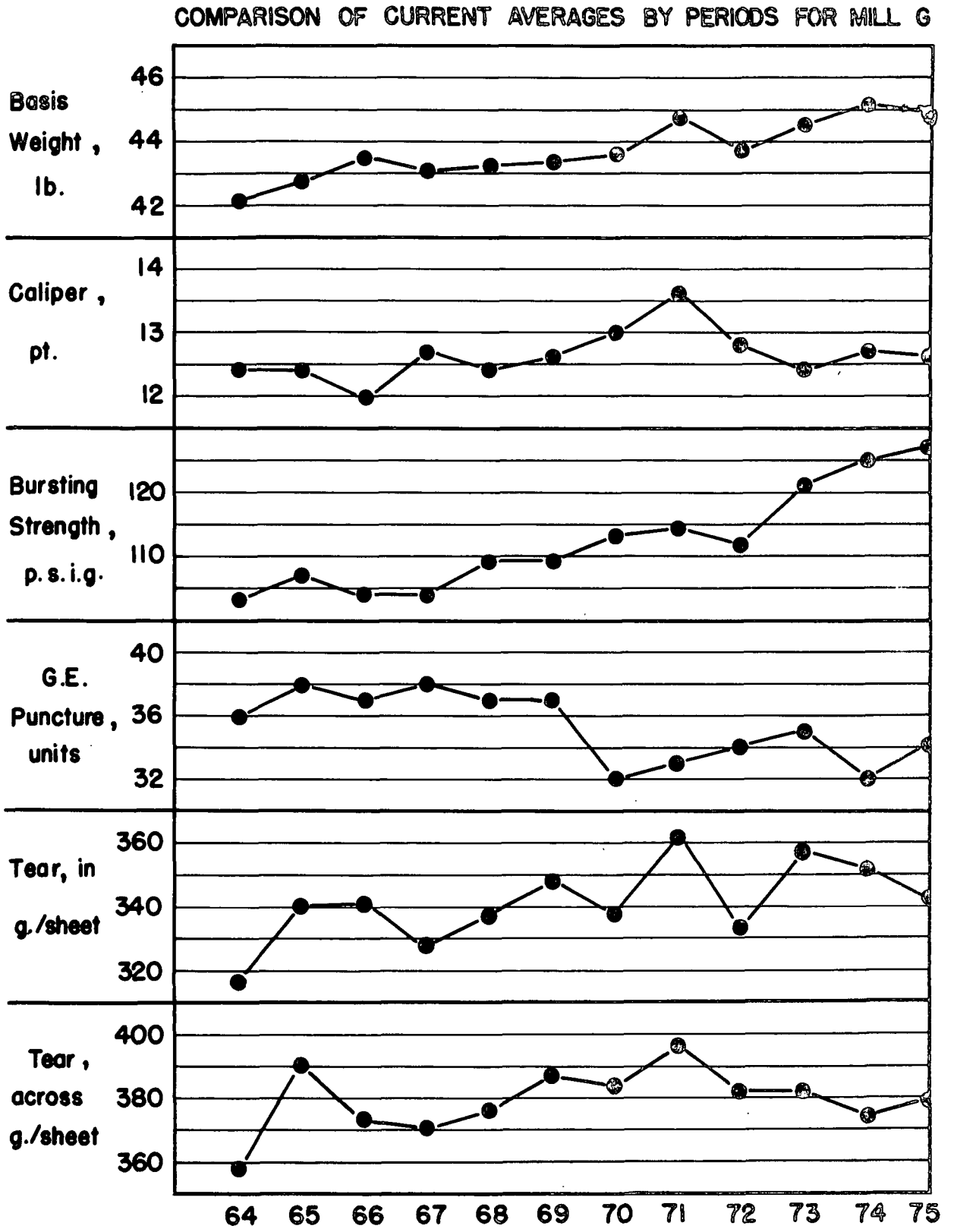

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL G
Basis Weight, lb.
46
44
42
Caliper, pt.
14
13
12
Bursting Strength, p.s.i.g.
120
110
G.E. Puncture, units
40
36
32
Tear, in g./sheet
360
340
320
Tear, across g./sheet
400
380
360
64
65
66
67
68
69
70
71
72
73
74
75
PERIOD

FIGURE 8

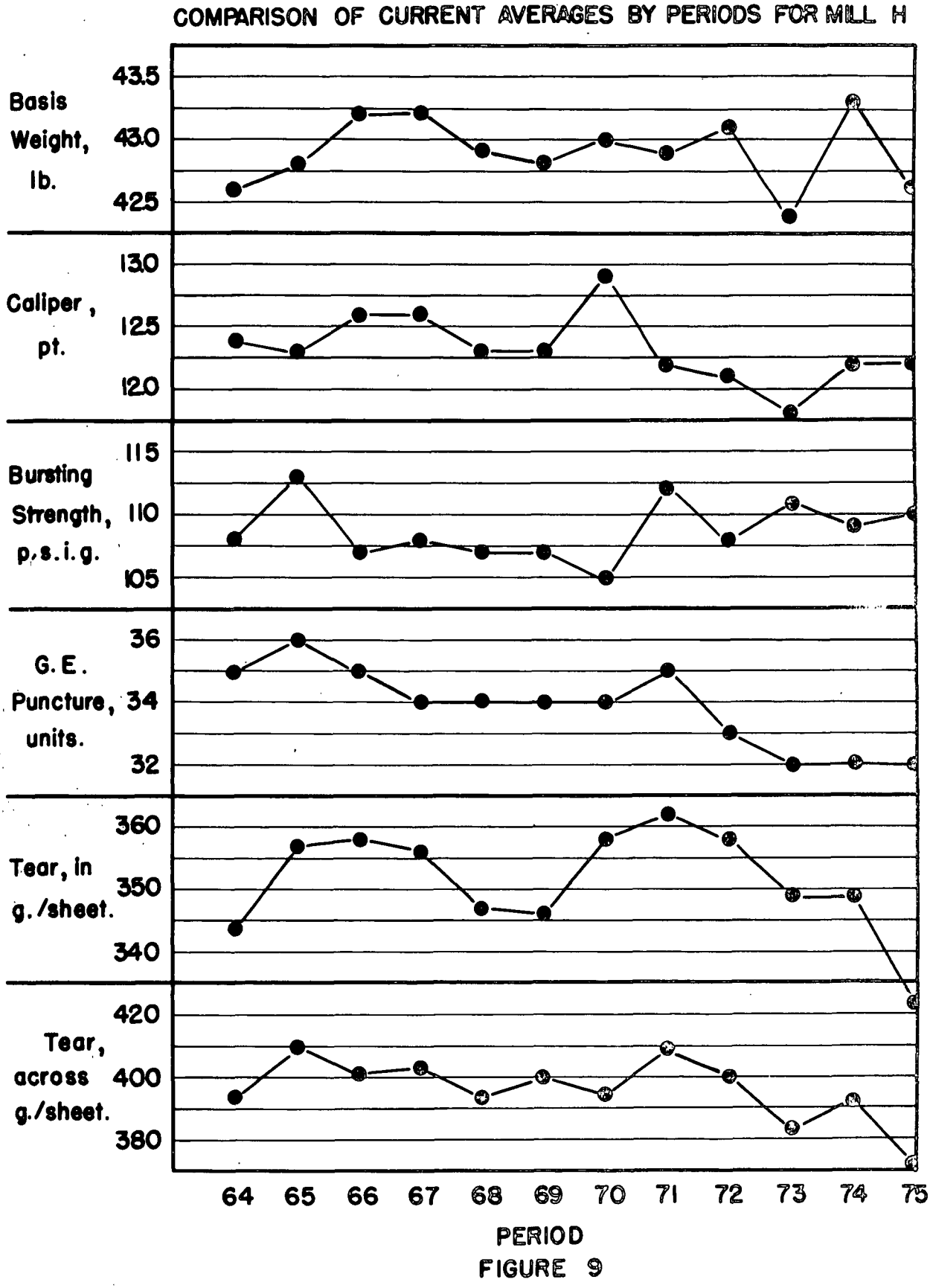

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL H
Basis Weight, lb.
43.5
43.0
42.5
Caliper, pt.
13.0
12.5
12.0
Bursting Strength, p.s.i.g.
115
110
105
G.E. Puncture, units.
36
34
32
Tear, in g./sheet.
360
350
340
Tear, across g./sheet.
420
400
380
64 65 66 67 68 69 70 71 72 73 74 75
PERIOD

FIGURE 9

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL I

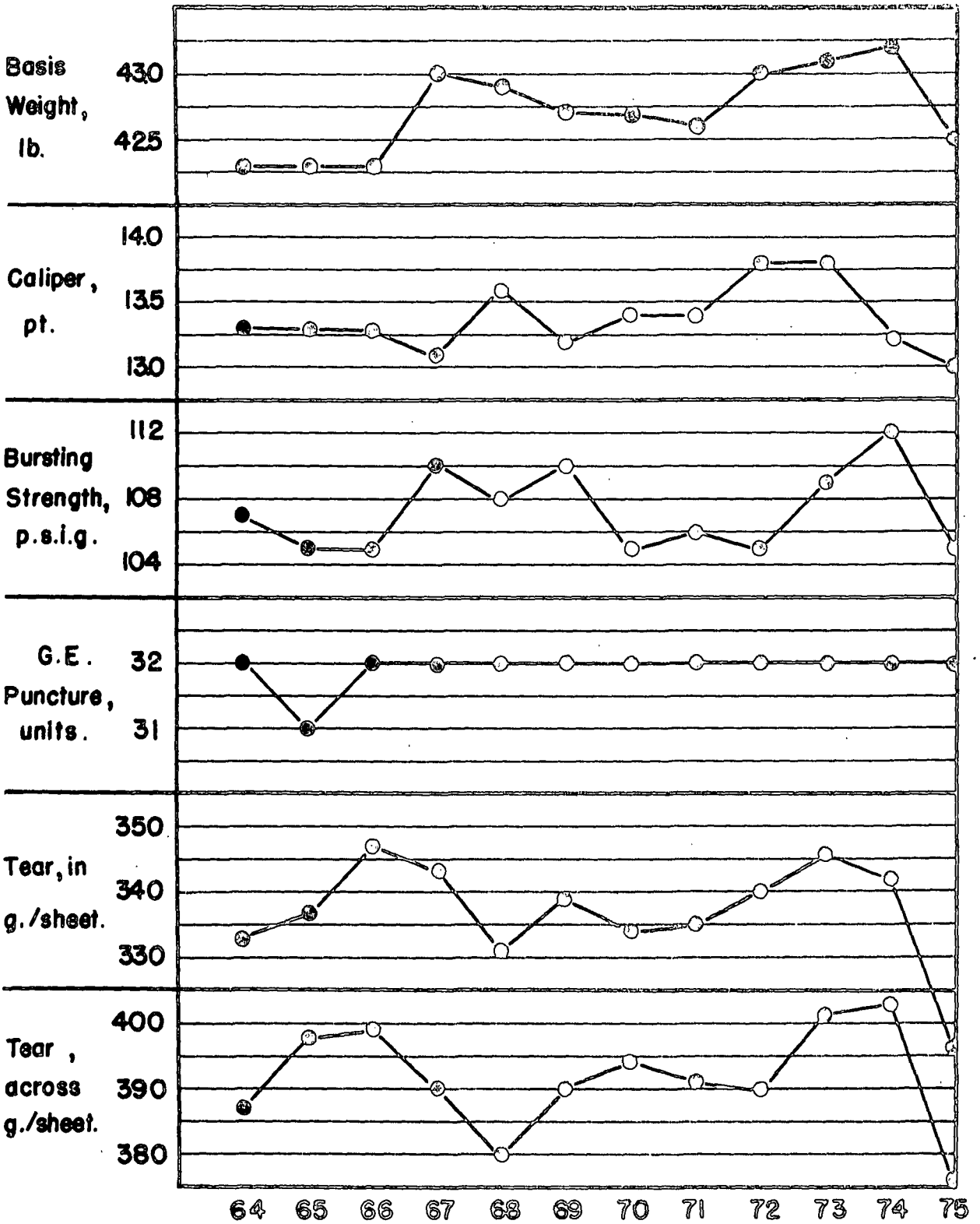


FIGURE 10

Pictured graphically in Figure 11 are the current mill averages shown in Table XIII for Mill J. It may be noted in Figure 11 that weight was variable during periods 64 to 75; caliper also was variable; bursting strength fluctuated widely; G. E. puncture increased slightly and Elmendorf tear maintained a variable level.

Mill K did not submit any sample lots during the past year.

The current mill averages for Mill L are presented in Table XIV and pictured graphically in Figure 12. The following trends are evident: increasing weight; caliper has varied between 13 and 14 points; bursting strength has maintained a relatively constant level; G. E. puncture values have increased whereas tearing strength values have varied rather widely and apparently decreased slightly.

Shown graphically in Figure 13 are the current mill averages given in Table XV for Mill M. It may be seen in Figure 12 that weight, caliper, and bursting strength have maintained relatively constant levels. G. E. puncture values have decreased somewhat. Tearing strength has maintained a relatively constant level.

Mill N submitted sample lots only during the 73rd and 74th periods and Mill O only during the 72nd, 73rd, and 74th periods. The current mill averages for Mill N are shown in Table XVI and for Mill O in Table XVII. Because of the limited number of periods for which sample lots were submitted, no graphic presentations of the data are given.

TABLE XIII

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL J

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
64	43.1	13.4	108	29	320	356
65	42.9	13.5	110	29	350	375
66	42.7	12.8	111	31	351	381
67	42.6	12.6	116	31	348	391
68	42.1	13.2	110	32	339	389
69	42.3	13.2	109	33	363	382
70	42.9	13.3	112	33	356	374
71	42.8	13.4	114	34	362	397
72	42.6	13.6	111	32	345	373
73	42.8	13.3	118	33	344	383
74	43.0	13.9	109	31	345	381
75	43.3	13.3	112	31	340	359

TABLE XIV

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL L

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
64	43.3	13.8	107	35	364	397
65	42.6	13.4	106	35	361	395
66	42.5	13.4	109	35	362	396
67	42.3	12.8	108	34	353	387
68	42.8	14.0	109	36	356	391
69	43.0	13.5	108	36	359	389
70	--	--	--	--	--	--
71	43.2	13.6	107	37	367	400
72	43.6	13.1	108	34	350	377
73	43.5	13.7	106	37	364	399
74	43.7	13.3	107	36	358	384
75	43.4	13.6	105	35	355	382

TABLE XV

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL M

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
64	42.3	13.4	105	36	388	409
65	43.0	13.6	106	36	391	403
66	43.5	13.9	104	35	402	406
67	43.2	13.7	107	35	370	401
68	43.0	13.8	110	34	377	389
69	43.4	13.7	118	35	386	418
70	42.8	13.6	110	34	369	410
71	43.0	13.8	109	36	395	415
72	42.9	13.5	111	34	389	403
73	43.1	13.3	114	34	377	413
74	43.3	13.9	106	36	401	410
75	42.8	13.2	112	33	379	393

TABLE XVI

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL N

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
73	42.3	12.2	105	30	326	364
74	42.4	12.2	109	33	344	380
75	42.4	12.1	110	31	335	372

TABLE XVII

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL O

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
72	41.7	12.0	107	31	333	368
73	41.8	12.0	107	36	343	373
74	42.1	12.4	111	36	345	377
75	40.7	12.2	109	32	331	365

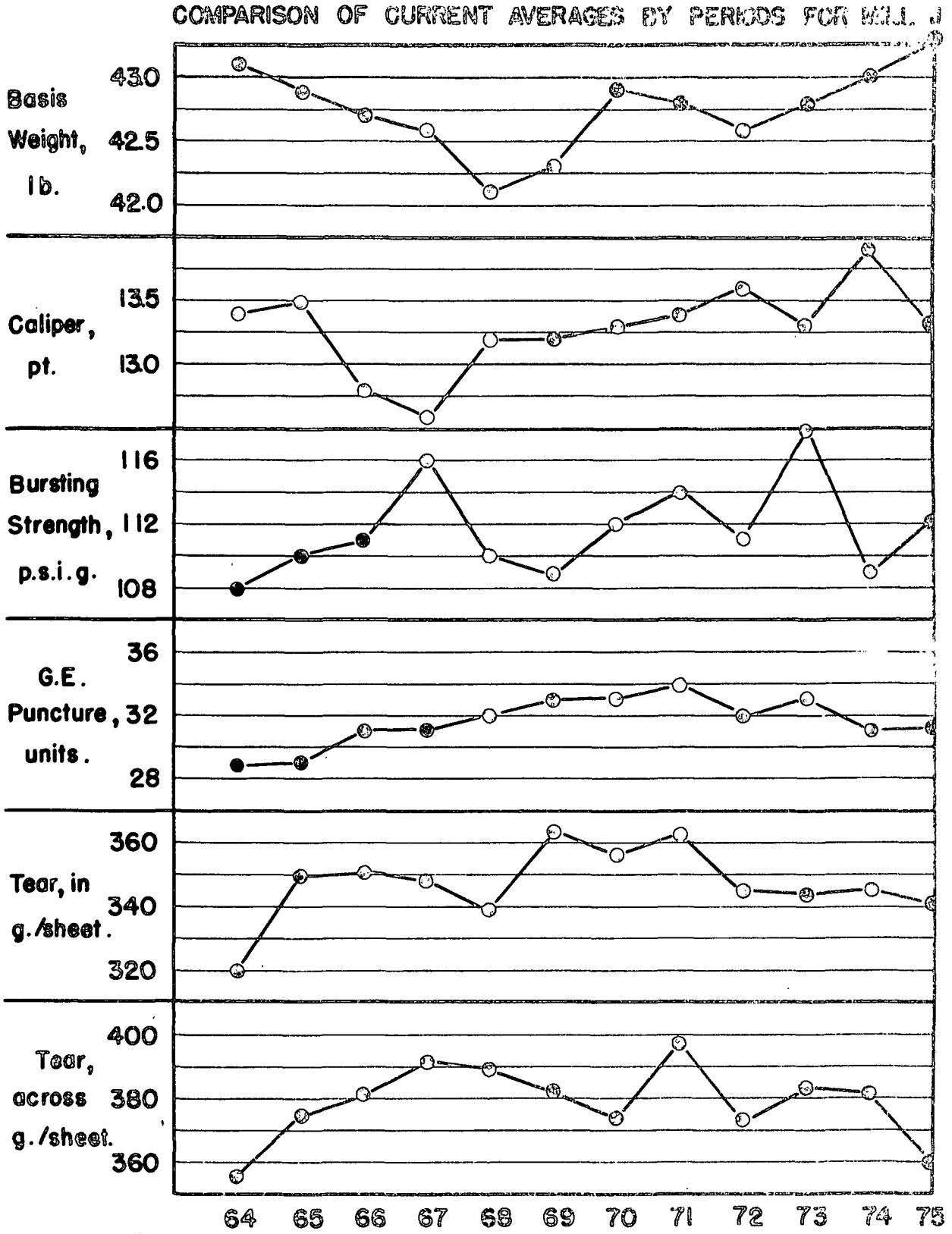

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL J
Basis Weight, lb.
43.0
42.5
42.0
Caliper, pt.
13.5
13.0
Bursting Strength, p.s.i.g.
116
112
108
G.E. Puncture, units.
36
32
28
Tear, in g./sheet.
360
340
320
Tear, across g./sheet.
400
380
360
64
65
66
67
68
69
70
71
72
73
74
75
PERIOD

FIGURE 11

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL L

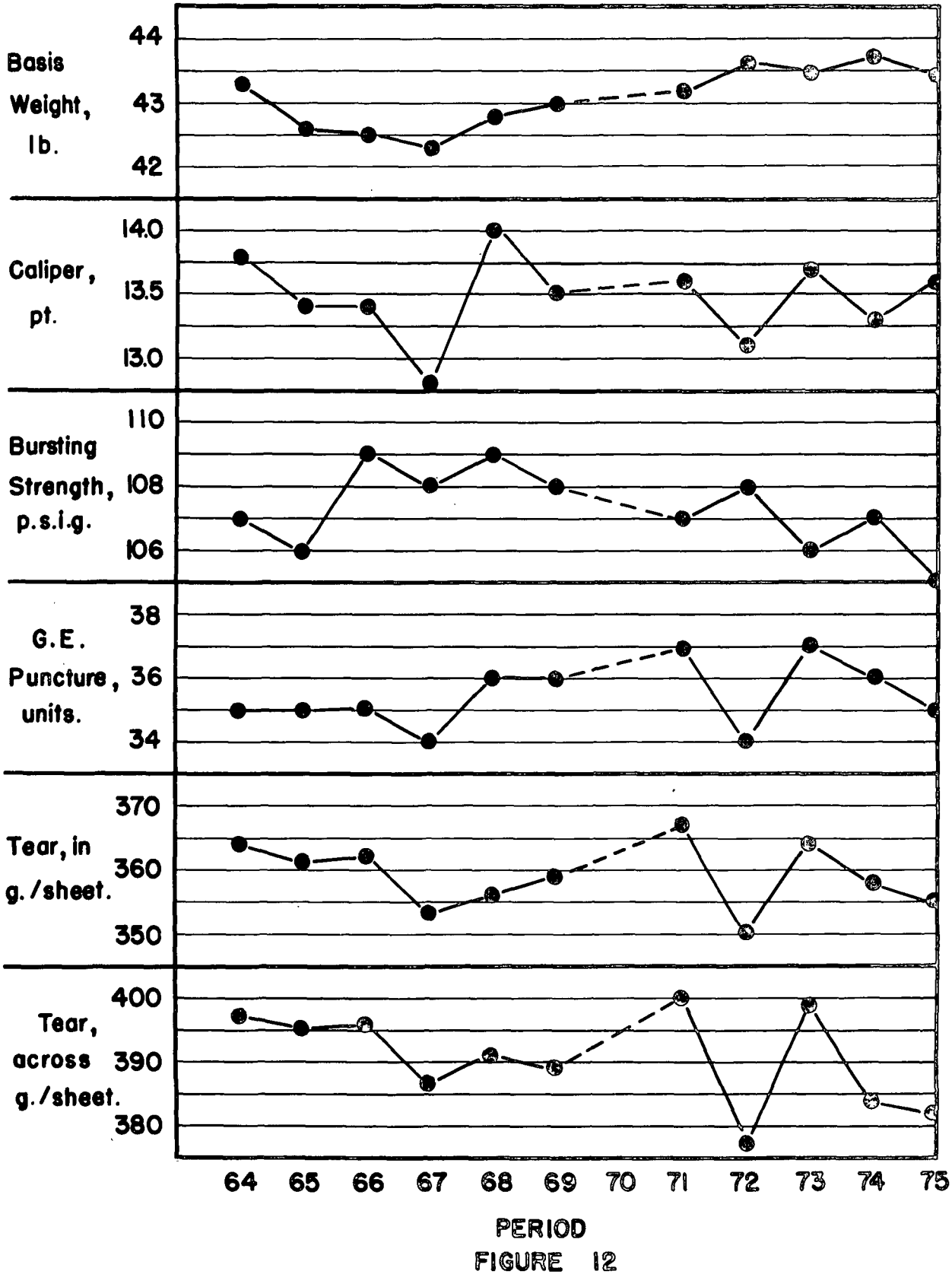


FIGURE 12

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL M

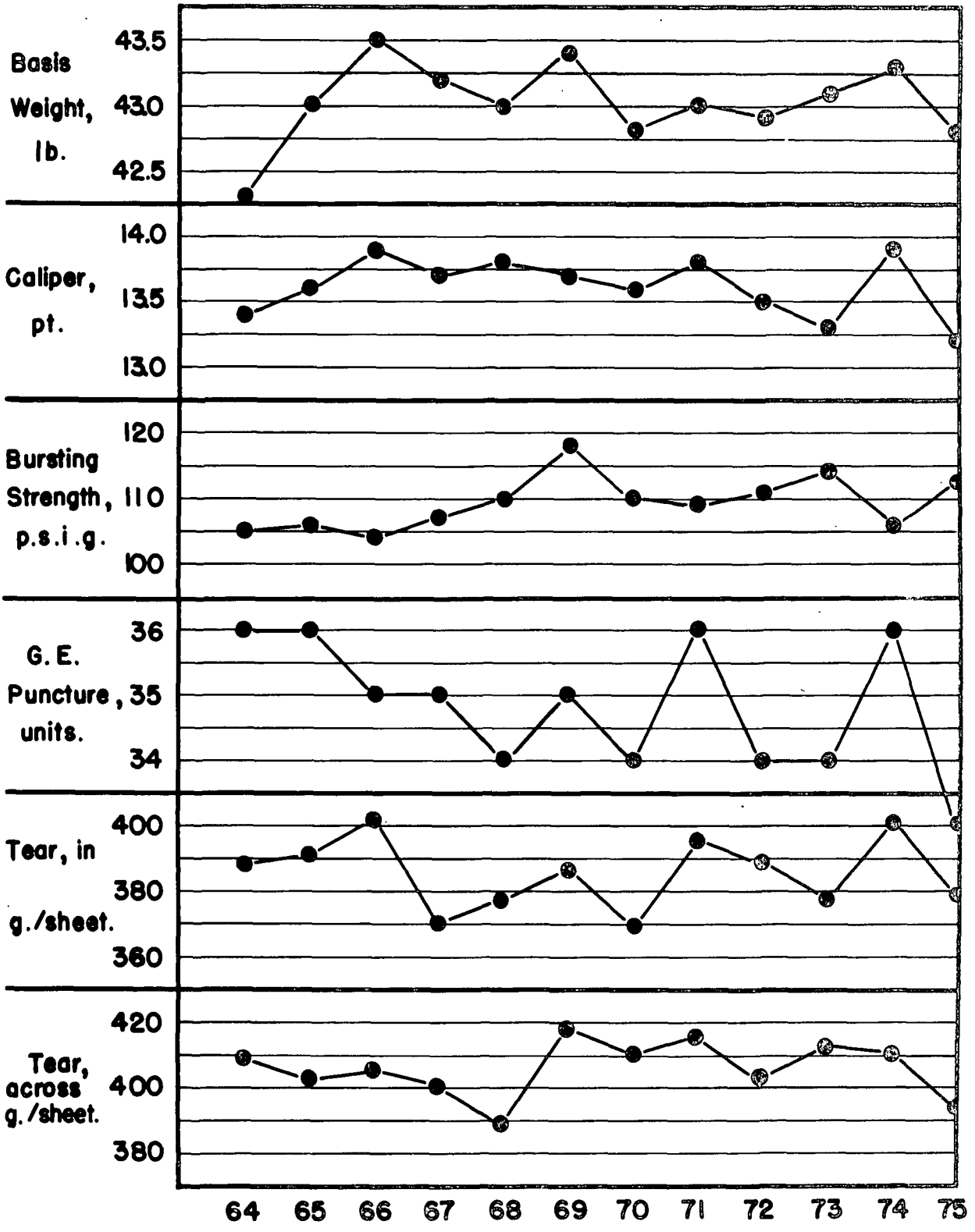


FIGURE 13

The current mill averages (drum linerboard) for Mill E are given in Table XVIII and illustrated graphically in Figure 14 where it may be noted that no very definite trends are evident.

A composite summary of the current F.K.I. averages from the inception of the Continuous Baseline Study to the present time is given in Table XIX. These results are illustrated graphically in Figure 15. It may be noted in Figure 15 that basis weight has remained relatively constant, being near the 43-lb. level at all times. A very definite trend to lower caliper has been evident and, at the present time, caliper values have leveled off at approximately 13 points. Bursting strength values for the seventy-five periods have exhibited no constant long-range trend. During the first thirty-six periods, bursting strength showed an upward trend; then, to period forty-three, a downward trend. Since then, bursting strength has maintained a high level. G. E. puncture values have exhibited a gradual decline throughout the seventy-five periods as have the machine and cross-machine direction tearing strength values. Thus, briefly summarized, the trends for the seventy-five periods have been the following:

1. Weight has remained relatively constant at approximately 43 lb.
2. Caliper has decreased from a high level of nearly 16 points and levelled off at approximately 13 points.
3. Bursting strength has exhibited upward and downward trends and is currently maintaining a high level near 110 points.
4. G. E. puncture has gradually declined from a high of 40 units for the first period to a low of 32 units at the present time.

TABLE XVIII

TABULATION OF CURRENT AVERAGES BY PERIODS FOR MILL E
(Drum Linerboard)

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i. g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Elmendorf Tear, g./sheet Across
64	47.9	15.3	107	36	404	398
65	47.0	15.1	108	37	416	392
66	46.8	15.3	109	37	428	403
67	47.8	15.7	108	37	431	396
68	47.8	14.4	110	36	440	413
69	46.6	15.2	104	37	444	405
70	47.9	15.3	107	40	447	424
71	47.6	15.4	108	40	414	435
72	46.6	14.7	105	38	391	396
73	45.8	15.4	94	38	375	389
74	46.1	14.1	107	37	386	404
75	46.9	14.1	91	39	402	395

COMPARISON OF CURRENT AVERAGES BY PERIODS FOR MILL E

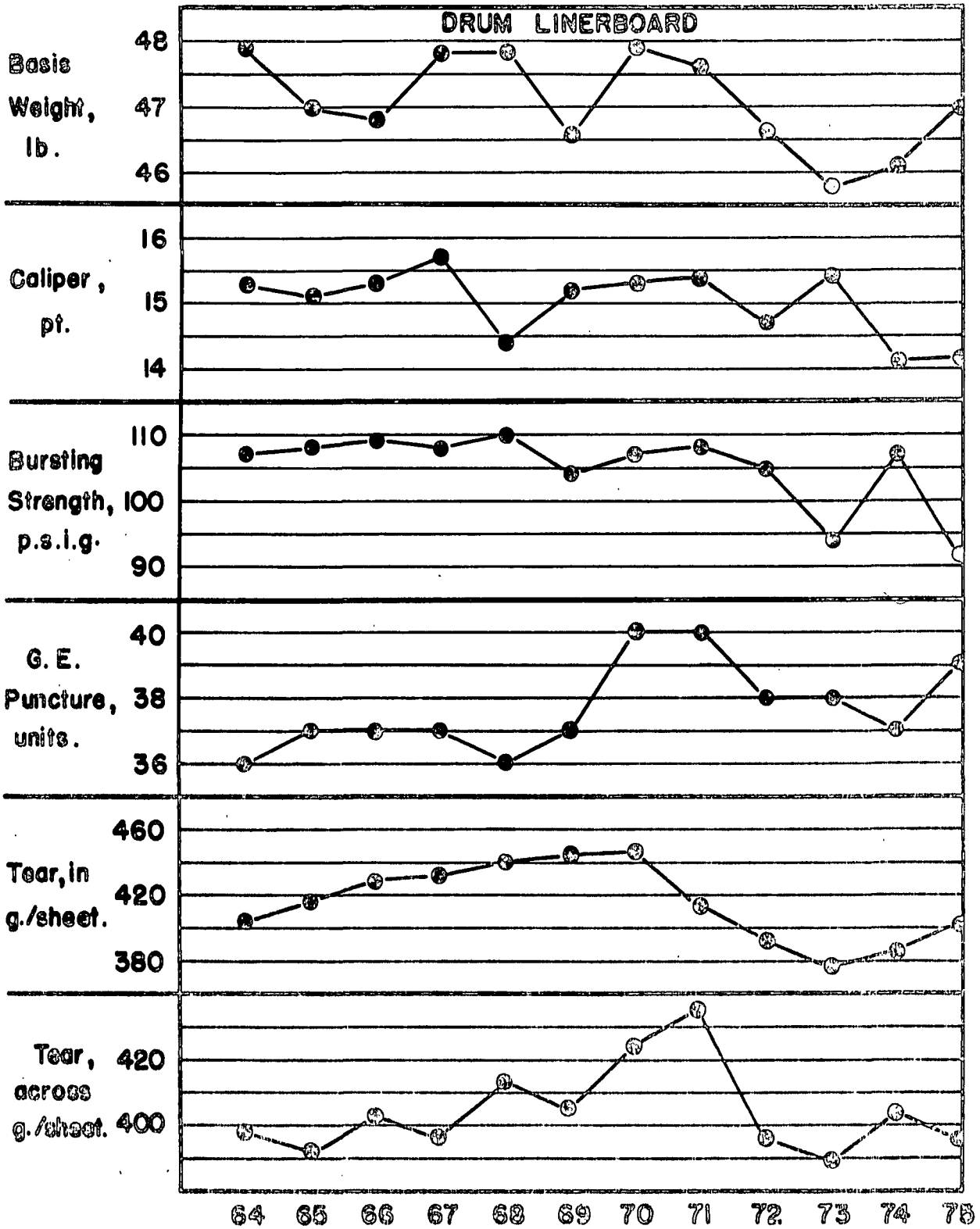
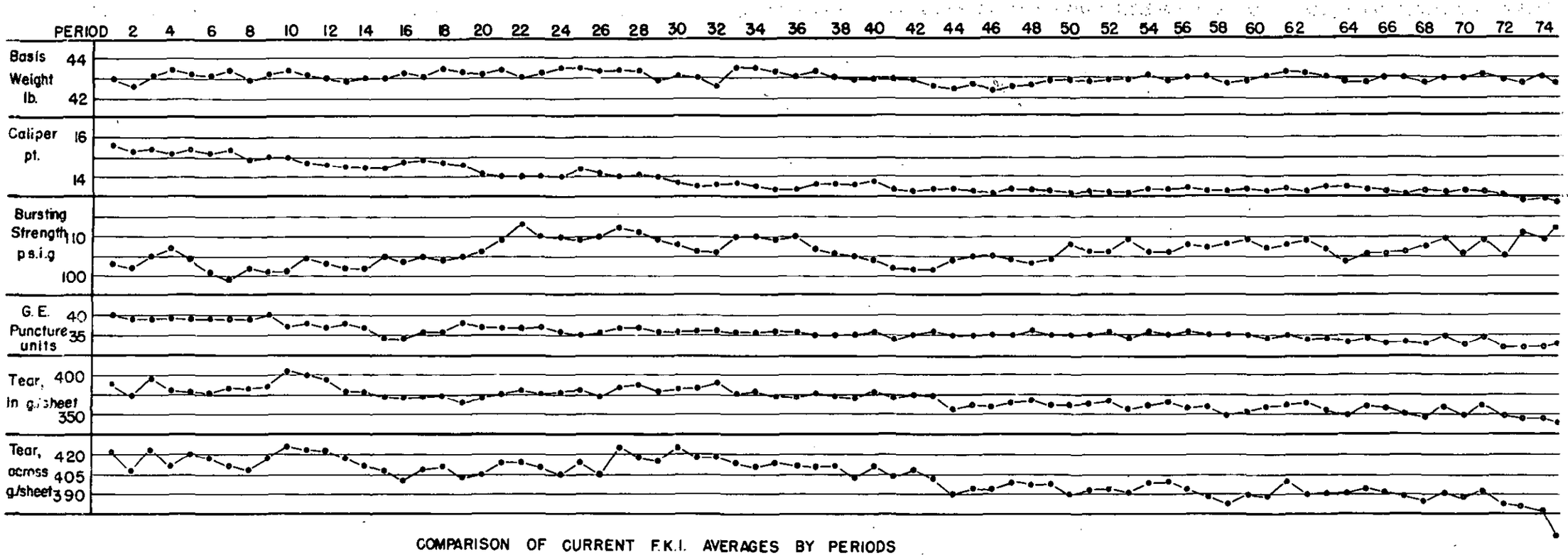


FIGURE 14



COMPARISON OF CURRENT F.K.I. AVERAGES BY PERIODS

FIGURE 15

TABLE XIX

TABULATION OF CURRENT F.K.I. AVERAGES BY PERIODS

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Across
1	42.9	15.6	103	40	389	422
2	42.6	15.3	102	39	373	408
3	43.1	15.4	105	39	395	423
4	43.4	15.2	107	39	381	412
5	43.2	15.4	104	39	378	419
6	43.1	15.2	101	39	377	416
7	43.4	15.4	99	39	384	411
8	42.9	14.9	102	39	383	409
9	43.2	15.0	101	40	387	416
10	43.4	15.0	101	37	403	426
11	43.2	14.7	104	38	400	423
12	43.0	14.6	103	37	394	423
13	42.9	14.5	102	38	379	416
14	43.0	14.5	102	37	379	411
15	43.0	14.5	105	34	372	409
16	43.3	14.8	104	34	370	400
17	43.1	14.9	105	36	372	408
18	43.5	14.8	104	36	374	411
19	43.3	14.6	105	38	364	401
20	43.2	14.2	106	37	372	406
21	43.4	14.1	109	37	376	415
22	43.0	14.1	113	37	381	414
23	43.3	14.1	110	37	377	410
24	43.5	14.1	110	36	379	405
25	43.5	14.4	109	35	382	414
26	43.4	14.2	110	36	374	404
27	43.4	14.0	112	37	385	425
28	43.4	14.1	111	37	388	417
29	42.9	14.0	109	36	379	415
30	43.1	13.7	108	36	383	425
31	43.0	13.6	106	36	384	418
32	42.6	13.6	106	36	390	418
33	43.6	13.7	110	36	376	413
34	43.5	13.5	110	36	379	410
35	43.3	13.4	109	36	374	414
36	43.2	13.4	110	36	372	411
37	43.3	13.7	107	35	379	412
38	43.0	13.7	106	35	372	411
39	42.9	13.6	105	35	369	402
40	42.9	13.8	104	36	379	412

TABLE XIX (Continued)

TABULATION OF CURRENT F.K.I. AVERAGES BY PERIODS

Period	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i.g.	G. E. Puncture, units	Elmendorf Tear, g./sheet In	Elmendorf Tear, g./sheet Across
41	42.9	13.4	102	34	371	403
42	42.9	13.3	102	35	374	408
43	42.6	13.4	102	36	373	401
44	42.5	13.4	104	35	357	390
45	42.7	13.3	105	35	362	395
46	42.4	13.2	105	35	359	393
47	42.6	13.4	104	35	365	399
48	42.6	13.3	103	36	367	397
49	42.8	13.3	104	35	362	397
50	42.9	13.2	108	35	362	389
51	42.8	13.3	106	35	363	393
52	42.9	13.2	106	36	367	395
53	42.9	13.2	109	34	357	391
54	43.2	13.4	106	36	362	398
55	42.9	13.4	106	35	365	398
56	43.0	13.4	108	36	358	394
57	43.1	13.3	107	35	359	388
58	42.7	13.3	108	35	348	382
59	42.9	13.4	109	35	354	390
60	43.1	13.3	107	34	360	388
61	43.3	13.4	108	35	363	400
62	43.2	13.3	109	34	364	390
63	43.1	13.5	107	34	356	390
64	42.9	13.5	107	34	353	391
65	42.9	13.4	108	35	364	400
66	43.0	13.2	108	34	360	394
67	43.0	13.1	108	34	353	390
68	42.9	13.3	109	34	350	388
69	43.0	13.2	110	35	363	397
70	43.0	13.4	108	34	358	390
71	43.2	13.4	110	35	364	399
72	43.0	13.1	108	33	351	387
73	42.9	12.9	111	33	349	385
74	43.1	13.0	110	33	347	382
75	42.7	12.8	112	33	341	374

5. Machine direction tearing strength has declined from 400 units at the start of the program to about 350 units currently.

6. Cross-machine direction tearing strength has slowly declined from a high value of more than 420 units at the inception of the study to approximately 380 units at the present time.